Subject: \_\_\_Algebra 2\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Teacher(s): \_Hannah Bond, Anna Harris\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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| **Standard**  **(State, Common Core, and ACT)** |  | | |
| **Student Target**  **(use student friendly language)** | **What students need to know (noun)** | **What students are to be able to do (verb)** |
| SPI 3103.1.1 Move flexibly between multiple representations (contextual, physical, written, verbal, iconic/pictorial, graphical, tabular, and symbolic) of non-linear and transcendental functions to solve problems, to model mathematical ideas, and to communicate solution strategies.  SPI 3103.1.2 Recognize and describe errors in data collection and analysis as well as identifying representations of data as being accurate or misleading.  S-IC: Make inferences and justify conclusions from sample surveys, experiments, and observational studies.  ACT: Distinguish between mean, median,  and mode for a list of numbers | * Use verbal, graphical, tabular, and symbolic information to solve math problems * Clearly communicate solution strategies   Recognize and describe how errors can be made in collecting data | Representations  Non-linear and transcendental functions  Problems  Solution strategies  Errors  Data collection  Analysis  Representations of data | Move  Solve problems  Model mathematical ideas  Communication solution strategies  Recognize  Describe  identify |
| **Critical Vocabulary** |

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| **Student Target**  **(use student friendly language)** | **What students need to know (noun)** | **What students are to be able to do (verb)** |
| SPI 3103.1.3 Use technology tools to identify and describe patterns in data using non-linear and transcendental functions that approximate data as well as using those functions to solve contextual problems.  SPI 3103.1.4 Use mathematical language, symbols, definitions, proofs and counterexamples correctly and precisely to effectively communicate reasoning in the process of solving problems via mathematical modeling with both linear and non-linear functions. | * Use calculators to identify patterns in data and/or functions and to solve real-life problems * Explain the strategy for using math concepts for solving a problem | Technology tools  Patterns in data  Non-linear and transcendental functions  Contextual problems  mathematical language, symbols, definitions, proofs and counterexamples  reasoning  process of solving problems  mathematical modeling  linear functions  non-linear functions | Use  Identify  Describe  solve  Use  Communication  Solve problems |
| **Critical Vocabulary** |

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| **Standard**  **(State, Common Core, and ACT)** |  | | |
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| SPI 3103.2.1 Describe any number in the complex number system.  ACT: Exhibit some knowledge of the complex numbers  N-CN: Perform arithmetic operations with complex numbers.  SPI 3103.2.2 Compute with all real and complex numbers.  SPI 3103.2.3 Use the number system, from real to complex, to solve equations and contextual problems. | * Define and give examples of each of the types of numbers in the complex number system. * Identify and apply the properties of numbers in the complex number system. * Add, subtract, multiply, and divide complex numbers. * Solve equations and real-life problems. | Number  Complex number system  Real numbers  Complex numbers  Number system  Equations  Contextual problems | Describe  Compute  Use  Solve |
| **Critical Vocabulary** |

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| **Student Target**  **(use student friendly language)** | **What students need to know (noun)** | **What students are to be able to do (verb)** |
| SPI 3103.3.1 Add, subtract and multiply polynomials; divide a polynomial by a lower degree polynomial.  SPI 3103.3.2 Solve quadratic equations and systems, and determine roots of a higher order polynomial.  SPI 3103.3.3 Add, subtract, multiply, divide and simplify rational expressions including those with rational and negative exponents.  SPI 3103.3.4 Use the formulas for the general term and summation of finite arithmetic and both finite and infinite geometric series.  ACT: Exhibit knowledge of logarithms and geometric sequences | * Define and give examples of each of the types of numbers in the complex number system. * Identify and apply the properties of numbers in the complex number system. * Add, subtract, multiply, and divide complex numbers. * Recognize and apply the general term and sigma notation for geometric series. | Number  Complex number system  Real numbers  Complex numbers  Number system  Equations  Contextual problems | Describe  Compute  Use  Solve |
| **Critical Vocabulary** |

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| **Student Target**  **(use student friendly language)** | **What students need to know (noun)** | **What students are to be able to do (verb)** |
| SPI 3103.3.5 Describe the domain and range of functions and articulate restrictions imposed either by the operations or by the contextual situations which the functions represent.  SPI 3103.3.6 Combine functions (such as polynomial, rational, radical and absolute value expressions) by addition, subtraction, multiplication, division, or by composition and evaluate at specified values of their variables.  SPI 3103.3.7 Identify whether a function has an inverse, whether two functions are inverses of each other, and/or explain why their graphs are reflections over the line y = x. | * Identify which relations are functions, and identify the domain and range for any relation. * Add, subtract, multiply, divide, and perform composition of any types of functions * Determine the inverse of a function either graphically or algebraically. Identify the inverse of a function visually. | Domain  Range  Functions  Restrictions  Contextual situations  Functions (such as polynomial, rational, radical and absolute value expressions)  Function  Inverse  Graphs  reflections | Describe  Articulate  Combine  Addition  Subtraction  Multiplication  Division  Composition  Evaluate  Identify  explain |
| **Critical Vocabulary** |

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| **Student Target**  **(use student friendly language)** | **What students need to know (noun)** | **What students are to be able to do (verb)** |
| SPI 3103.3.8 Solve systems of three linear equations in three variables.  SPI 3103.3.9 Graph the solution set of two or three linear or quadratic inequalities.  SPI 3103.3.10 Identify and/or graph a variety of functions and their transformations.  SPI 3103.3.11 Graph conic sections (circles, parabolas, ellipses and hyperbolas) and understand the relationship between the standard form and the key characteristics of the graph.  SPI 3103.3.12 Interpret graphs that depict real-world phenomena. | * Solve systems of three linear equations in 3 variables. * Solve systems of equations by graphing. * Graph a variety of functions and understand ways the graph can be changed. * Understand and use the standard form equations and key characteristics to graph conic sections. * Use graphs to draw conclusions about real-world situations. | Systems  Linear equations  Variables  Solution set  Linear or quadratic inequalities  Functions  Transformations  Conic sections (circles, parabolas, ellipses and hyperbolas)  Relationship  Standard form  Key characteristics of graph  Graphs  Real-world phenomena | Solve  Graph  Identify  Graph  Graph  Understand  Interpret |
| **Critical Vocabulary** |

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| **Student Target**  **(use student friendly language)** | **What students need to know (noun)** | **What students are to be able to do (verb)** |
| SPI 3103.3.13 Solve contextual problems using quadratic, rational, radical and exponential equations, finite geometric series or systems of equations.  SPI 3103.3.14 Solve problems involving the binomial theorem and its connection to Pascal’s Triangle, combinatorics, and probability.  SPI 3103.4.1 Exhibit knowledge of unit circle trigonometry.  SPI 3103.4.2 Match graphs of basic trigonometric functions with their equations. | * Solve real-world problems using a variety of functions * Use the binomial theorem to solve problems. * Draw, label, and use the unit circle. * Match basic trig functions with their equations and graphs. | Contextual problems  quadratic, rational, radical and exponential equations, finite geometric series or systems of equations  problems  binomial theorem  Pascal’s Triangle  Combinatorics  Probability  Unit circle  Trigonometry  Graphs  Trigonometric functions  equations | Solve  Solve  Exhibit knowledge  Match |
| **Critical Vocabulary** |

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| **Student Target**  **(use student friendly language)** | **What students need to know (noun)** | **What students are to be able to do (verb)** |
| SPI 3103.4.3 Describe and articulate the characteristics and parameters of parent trigonometric functions to solve contextual problems.  SPI 3103.5.1 Compute, compare and explain summary statistics for distributions of data including measures of center and spread.  SPI 3103.5.2 Compare data sets using graphs and summary statistics.  SPI 3103.5.3 Analyze patterns in a scatter-plot and describe relationships in both linear and non-linear data. | * Use basic trig functions to solve real-world problems. * Compare sets of data and draw conclusions using statistics for distributions. * Compare sets of data and draw conclusions using graphs and summary statistics. * Create and analyze scatter-plots. | Characteristics  Parameters  Parent trig functions  Contextual problems  Summary statistics  Distributions  Data  Measures of center and spread  Data sets  Graphs  Summary statistics  Patterns  Scatter-plot  Relationships  Linear and non-linear data | Describe  Articulate  Solve  Compute  Compare  Explain  Compare  Analyze  Describe |
| **Critical Vocabulary** |

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| **Student Target**  **(use student friendly language)** | **What students need to know (noun)** | **What students are to be able to do (verb)** |
| SPI 3103.5.4 Apply the characteristics of the normal distribution.  SPI 3103.5.5 Determine differences between randomized experiments and observational studies.  SPI 3103.5.6 Find the regression curve that best fits both linear and non-linear data (using technology such as a graphing calculator) and use it to make predictions.  SPI 3103.5.7 Determine/recognize when the correlation coefficient measures goodness of fit. | * Apply the characteristics of the normal distribution. * Determine the differences between experiments and observations. * Use regression to find an equation that approximates a set of data, and use it to make predictions. * Appropriately use a correlation coefficient to measure goodness of fit. | Characteristics  Normal distribution  Differences  Randomized experiments  Observational studies  Regression curve  Linear and non-linear data  Predictions  Correlation coefficient  Goodness of fit | Apply  Determine  Find  Use  Make predictions  Determine  Recognize  Measures |
| **Critical Vocabulary** |

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| **Student Target**  **(use student friendly language)** | **What students need to know (noun)** | **What students are to be able to do (verb)** |
| SPI 3103.5.8 Apply probability concepts such as conditional probability and independent events to calculate simple probability. | * Calculate the probability for both conditional and independent events. | Probability concepts  Conditional probability  Independent events  Simple probability | Apply  Calculate |
| **Critical Vocabulary** |